

## **Shrimp Farms: The Next Threat to Galveston Bay**

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Shrimp mariculture has migrated up the Texas coast and may soon threaten Galveston Bay. This activity poses three major threats to the health of the Galveston Bay ecosystem: (1) degradation of water quality, (2) the potential introduction of an exotic shrimp species, and (3) the potential introduction of an exotic shrimp pathogen or parasite. All of these threats have occurred in Texas estuaries and their environmental impact is unpredictable and potentially irreversible. The ecological footprint of a shrimp farm, linked directly to its adjoining estuary, is much larger than the upland area occupied by the farm. Application of the Precautionary Principle would lead shrimp farmers and agency regulators to adopt a conservative approach until the absence of an environmental threat has been demonstrated.

Ecologically sustainable shrimp farming is readily achievable. First, nutrient input can be reduced by improving shrimp feeding efficiency. Next, shrimp pond effluent can be treated with simple, well-demonstrated techniques such as adequately-sized sedimentation ponds to reduce suspended sediments, a biological filtration pond stocked with filter-feeding species such as clams and oysters to remove plankton and other suspended particles, and final passage through specially-designed wetlands to remove excess nutrients. Waste water treated in this fashion should be acceptable for recycling through the shrimp ponds. Shifting to the culture of only native shrimp species will remove the major threat to coastal ecosystems. Finally, raising shrimp at moderate, but profitable, densities will reduce the threat from indigenous and non-indigenous pathogens and parasites.

The *Code of Practice to Reduce the Risks of Adverse Effects Arising from Introductions and Transfers of Marine Species* of the International Council for the Exploration of the Seas, the *Code of Conduct for Responsible Fisheries* of the United Nations Food and Agriculture Organization, and the *Statement of Organization Practices and Guidelines* of the Gulf of Mexico Fisheries Management Council all strongly advise against the use of non-indigenous species in aquaculture. The U.S. Marine Shrimp Farming Program, the Texas Parks & Wildlife Department, and the shrimp farmers have all ignored this advice by promoting, permitting and importing non-indigenous shrimp into Texas. Introducing exotic species in farm ponds is equivalent to their deliberate release into the wild because such organisms always escape.